

2006 VISN 12 Residency Project

Title of Project: Evaluation of Electronically Flagged Medication Orders for Inpatients in a Veterans Affairs Medical Center-2006

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Objective(s):

- Review the computerized prescriber order entry system (CPOE)
- Effects of CPOE implementation: clinical trials
- Review the veterans affairs medical center CPOE system
- Evaluate inpatient orders flagged electronically at a veterans affairs medical center

Methods: Orders flagged between November 1, 2004 to October 31, 2005 was obtained from an electronic 'order' file by the North Chicago Information Resource Management (IRM). Then, this data was sorted into Microsoft Excel spreadsheet. The file contained who entered the order, when the order was flagged, who and when the order was unflagged, and the medication order. All patient identifiable information was not included in the file.

Endpoints

- Primary: Incidence of order flagged by the inpatient pharmacist
- Secondary: Number and type of flagged orders by date, response, and reason for the flag

Each flagged order was coded (flag order code) then grouped into one of the categories (flag type) listed in the table below.

Flag order code	Flag Type
AF	Accidentally flagged
<i>Multiple*</i>	<i>Combination*</i>
N/A	Medication availability
MISC	Miscellaneous
APP, MISS, PRN	Omission
ADR, ALL, ALT, D, DD, DF, DR, DUP, LAB, LOT, MC, OBS, RT, S	Patient safety
AB, NF, PAIN	Policy-driven restrictions
IE	System-related error
UNKWN	Unknown

*Orders with ≥ 1 flag type

AB: abbreviation, ADR: adverse drug reaction, AF: accidentally flagged, ALL: allergy, ALT: alternative therapy recommendation, D: dose, DD: drug-drug/disease/age interaction, DF: dosage form, DR: drug, DUP: duplication, IE: incorrect entry, LAB: laboratory, LOT: length of therapy, MC: medication reconciliation, MISS: missing, N/A: not available, NF: policy-driven restrictions, OBS: obsolete order, PAIN: orders for pain requiring specification of the pain, PRN: prn orders w/o indication, RT: route, S: schedule, UNKWN: unknown

Response rate (response by the prescriber)

As with the flags codes, the type of response by the prescriber was also coded. A message by the prescriber when the order was unflagged constituted as a response to the flag by the pharmacist.

Response Code	Description
AF	Order accidentally flagged
N	Order unflagged <i>without</i> a corresponding message of action
NA	No action taken by the prescriber
SA	Order unflagged by the same person or department that flagged the order
Y	Order unflagged <i>with</i> a corresponding message of action

Outcome(s):

- Primary end-point
 - Total of 3727 orders flagged between November 1, 2004 to October 31, 2005
 - 112 orders classified as 'unknown', 10 orders classified as 'miscellaneous', 44 order had multiple flag codes (counted twice if categorized under ≥ 2 flag types)
- Secondary end-point
 - Average of 8.4% of inpatient orders flagged per month
 - Highest incidence during August (398, 11%) and September (415, 11%)

Flag Type	Number of flagged orders	Flag code	Number of flagged orders (> 5%)
Patient Safety	1764 (47%)	ADR, ALL, ALT, <u>D</u> , DD, DF, DR, <u>DUP</u> , LAB, LOT, MC, OBS, RT, <u>S</u>	D= 247 (7%), DUP= 407 (11%), S= 485 (13%)
Omission	815 (22%)	APP, MISS, <u>PRN</u>	PRN= 574 (15%)
System related error	386 (10%)	IE	IE= 386 (10%)

- Response rates
 - Response code: AF=42 (1%), N=732 (20%), NA=270 (7%), SA=302 (8%), Y=2381 (64%)
 - Higher response rate (response code Y) for flags related to patient safety (32%)

Barriers/Limitations:

- Retrospective design
- Response rates over-estimation
- Personal variation between pharmacists in the methods of alerting prescribers

Conclusion(s):

Many clinical trials have shown that CPOE greatly reduces the incidence of medication errors. However, there have also been reports that CPOE may facilitate different type of errors. At this institution, key factors that required pharmacist intervention included omission of indication of use for PRN orders, incorrect schedule, duplication, and system-related error. Furthermore, the incidence of orders flagged was highest during the months of August and September when new medical residents arrive. This indicates the possibility for reassessing the current CPOE training process. It is important to note that the errors reported in this study are not actual medication errors, but rather potential medication errors that required pharmacist intervention. Further studies are needed to assess the impact of pharmacist intervention in a facility with CPOE and the rate of medication errors.

Future Directions:

- Assess the impact of training by users of CPOE on the incidence of orders flagged
- Compare medication error rates with flag rates